

Rejections Under 35 U.S.C. § 103

Claim 40 was rejected under 35 USC § 103(a) as being unpatentable over Fujiwara (U.S. Patent No. 5,798,548) in view of Weitzel et al. (U.S. Patent No. 5,661,312, Weitzel) and Hamakawa et al. (JP 357126175A, Hamakawa). The applicant respectfully traverses.

Fujiwara issued on 25 August 1998, which is after the 29 July 1997 filing date of the parent application. The applicant does not admit that Fujiwara is prior art, and reserves the right to swear behind Fujiwara at a later date.

Weitzel issued on 26 August 1997, which is after the 29 July 1997 filing date of the parent application. The applicant does not admit that Weitzel is prior art, and reserves the right to swear behind Weitzel at a later date.

The Office Action discusses Fujiwara, Weitzel, and Hamakawa, but does not cite a motivation to combine these references. Office Action, pages 3-4.

The MPEP states the following with regard to rejections under 35 USC § 103:

“To establish a *prima facie* case of obviousness ... there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.” MPEP 2143.

A recent Federal Circuit opinion, *In re Lee*, 61 USPQ2d 1430 (Fed. Cir. 2002), specifically requires that the suggestion or motivation to combine references “be based on objective evidence of record.” The court also stated that “[t]his factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority.” Another Federal Circuit opinion states that the suggestion or motivation to combine references must be found in the prior art. MPEP 2143 citing *In re Vaeck*, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991).

The Office Action discusses Fujiwara, Weitzel, and Hamakawa, and silicon carbide, but the Office Action did not cite text in any of Fujiwara, Weitzel, and Hamakawa as the source of the motivation for combining these references as is required by *In re Lee*. Office Action, page 4. The discussion in the Office Action appears to cite several reasons why claim 40 is obvious, but it is not clear to the applicant how Fujiwara, Weitzel, and Hamakawa are being combined. It is not clear whether Fujiwara is being modified, and if so, how Weitzel and Hamakawa are being relied on to modify Fujiwara.

The applicant respectfully submits that a *prima facie* case of obviousness of claim 40 has not been established in the Office Action, and that claim 40 is in condition for allowance.

Claims 36 and 37 were rejected under 35 USC § 103(a) as being unpatentable over Fujiwara in view of Weitzel and Hamakawa.

The Office Action did not cite text in any of Fujiwara, Weitzel, and Hamakawa as the source of the motivation for combining these references as is required by *In re Lee*. Office Action, page 5. The discussion in the Office Action appears to cite several reasons why claims 36 and 37 are obvious, but it is not clear to the applicant how Fujiwara, Weitzel, and Hamakawa are being combined.

The applicant respectfully submits that a *prima facie* case of obviousness of claims 36 and 37 has not been established in the Office Action, and that claims 36 and 37 are in condition for allowance.

Claims 36-39 were rejected under 35 USC § 103(a) as being unpatentable over Weitzel. The applicant respectfully traverses.

Weitzel describes a vertical MOSFET 10. The Office Action states that "it would have been obvious to increase the carbon content to a value x greater than 0.5 because the purpose of the invention by Weitzel is to increase the breakdown voltage." Office action, page 6. However, Weitzel shows that a high breakdown voltage of the MOSFET 10 is provided by a breakdown enhancement layer 20, as is described in column 1, lines 45-49 and column 2, lines 6-16. Weitzel shows gates 18 that are made from one of a list of materials including silicon

carbide (column 1, lines 57-64), but the material of the gates 18 is not shown to affect the breakdown voltage. There is no apparent connection between the breakdown voltage and the material of the gates 18 in Weitzel. The Office Action therefore has not cited text in Weitzel that is the source of a motivation for modifying Weitzel as is required by *In re Lee*.

The applicant respectfully submits that a *prima facie* case of obviousness of claims 36-39 has **not** been established in the Office Action, and that claims 36-39 are in condition for allowance.

Claims 41-44 were rejected under 35 USC § 103(a) as being unpatentable over Fujiwara in view of Miyawaki (U.S. Patent No. 5,808,336). The applicant respectfully traverses.

Miyawaki issued on 15 September 1998, which is after the 29 July 1997 filing date of the parent application. The applicant does not admit that Miyawaki is prior art, and reserves the right to swear behind Miyawaki at a later date.

Claims 41-44 are dependent on claim 40, and recite further limitations with respect to claim 40. Weitzel and Hamakawa are not applied in this rejection of claims 41-44, yet they were applied in the rejection of the independent claim 40. As discussed above with respect to the rejection of claim 40, it is not clear whether Fujiwara is being modified, and if so, how Weitzel and Hamakawa are being relied on to modify Fujiwara.

Claim 41 recites that the intergate dielectric is formed of silicon dioxide. The Office Action refers to column 9, lines 1-10 of Miyawaki that show an insulating film 61 of poly-Si. Miyawaki does not show a dielectric of silicon dioxide. This text of Miyawaki does not suggest a modification of Fujiwara as is required by *In re Lee*.

Also, the Office Action specifically addressed claims 42-44, but did not cite a showing in Fujiwara or Miyawaki to support the rejection. It is not clear how Fujiwara and Miyawaki are being applied to reject claims 42-44.

The applicant respectfully submits that a *prima facie* case of obviousness of claims 41-44 has **not** been established in the Office Action, and that claims 41-44 are in condition for allowance.

Claim 45 was rejected under 35 USC § 103(a) as being unpatentable over Weitzel in view of Shrivastava et al. (U.S. Patent No. 5,557,122, Shrivastava). The applicant respectfully traverses.

Shrivastava issued on 17 September 1996, which is less than one year before the 29 July 1997 filing date of the parent application. The applicant does not admit that Shrivastava is prior art, and reserves the right to swear behind Shrivastava at a later date.

Claim 45 is dependent on claim 40, and recites further limitations with respect to claim 40. Claim 40 was rejected based on a combination of Fujiwara, Weitzel, and Hamakawa, and none of these references has been applied in this rejection of claim 45.

For the reasons stated above with respect to the rejection of claim 40, and the limitations in the claim, the applicant respectfully submits that a *prima facie* case of obviousness of claim 45 has **not** been established in the Office Action, and that claim 45 is in condition for allowance.

Claims 36-39 were rejected under 35 USC § 103(a) as being unpatentable over Weitzel in view of Hamakawa. The applicant respectfully traverses.

The Office Action discusses many reasons for combining Weitzel and Hamakawa. For example, the Office Action states that “[o]bviously, a lower electron affinity is the cause of the improvement of said photoelectric conversion efficiency” and “[s]uch a layer would fit nicely into a silicon carbide device.” Office Action, page 9. It is not clear what showing in Weitzel and Hamakawa is being relied on to combine the two references. The Office Action has not clearly identified text in Weitzel and Hamakawa as the source of the motivation for combining these references as is required by *In re Lee*.

The applicant respectfully submits that a *prima facie* case of obviousness of claims 36-39 has **not** been established in the Office Action, and that claims 36-39 are in condition for allowance.

Claims 56-57 were rejected under 35 USC § 103(a) as being unpatentable over Fujiwara in view of Weitzel and Hamakawa. The applicant respectfully traverses.

The Office Action has not referred to specific text in Fujiwara, Weitzel, or Hamakawa to support their combination as is required by *In re Lee*. For example, the Office Action states that

“[o]bviously, said photoelectric conversion efficiency is favorably affected by the lowering of the electron affinity.” Office Action, page 11. There is no cited support for this statement in the prior art.

The applicant respectfully submits that a *prima facie* case of obviousness of claims 56-57 has **not** been established in the Office Action, and that claims 56-57 are in condition for allowance.

Claim 58 was rejected under 35 USC § 103(a) as being unpatentable over Fujiwara, Weitzel, Hamakawa, and Shrivastava. The applicant respectfully traverses.

The Office Action relies on the combination of Fujiwara, Weitzel, and Hamakawa as applied to the rejection of claim 56. The applicant respectfully submits that this combination of references is not adequately supported by reference to specific text in the references as is discussed above with respect to claim 56.

For the reasons stated above with respect to the rejection of claim 56, and the limitations in the claim, the applicant respectfully submits that a *prima facie* case of obviousness of claim 58 has **not** been established in the Office Action, and that claim 58 is in condition for allowance.

Claim 59 was rejected under 35 USC § 103(a) as being unpatentable over Fujiwara in view of Weitzel and Hamakawa. The applicant respectfully traverses.

The Office Action has not referred to specific text in Fujiwara, Weitzel, or Hamakawa to support their combination as is required by *In re Lee*. For example, the Office Action states that “[o]bviously, the photoelectric conversion efficiency is favorably affected by the lowering of the electron affinity.” Office Action, page 12. There is no cited support for this statement in the prior art.

The applicant respectfully submits that a *prima facie* case of obviousness of claim 59 has **not** been established in the Office Action, and that claim 59 is in condition for allowance.

Claims 60-61 were rejected under 35 USC § 103(a) as being unpatentable over Fujiwara, Weitzel, and Hamakawa as applied to claim 59 above, and further in view of Miyawaki.

The Office Action relies on the combination of Fujiwara, Weitzel, and Hamakawa as

applied to the rejection of claim 59. The applicant respectfully submits that this combination of references is not adequately supported by reference to specific text in the references as is discussed above with respect to claim 59.

For the reasons stated above with respect to the rejection of claim 59, and the limitations in the claims, the applicant respectfully submits that a *prima facie* case of obviousness of claims 60-61 has **not** been established in the Office Action, and that claims 60-61 are in condition for allowance.

Claims 62 and 65 were rejected under 35 USC § 103(a) as being unpatentable over Fujiwara in view of Halvis et al. (US 5,369,040, Halvis). The applicant respectfully traverses.

The Office Action has not referred to specific text in Fujiwara or Halvis to support their combination as is required by *In re Lee*. For example, the Office Action states that “[t]he inventions by Fujiwara and Halvis et al can be combined as nothing else would have to be modified in the basic transistor design” and “the motivation for lowering the carbon content stems from the cost of introducing the carbon.” Office Action, page 13. There is no cited support for these statements in the prior art.

The applicant respectfully submits that a *prima facie* case of obviousness of claims 62 and 65 has **not** been established in the Office Action, and that claims 62 and 65 are in condition for allowance.

Claims 63-64 were rejected under 35 USC § 103(a) as being unpatentable over Fujiwara, Halvis, and Miyawaki. Claims 66-67 were rejected under 35 USC § 103(a) as being unpatentable over Fujiwara, Halvis, and Miyawaki. The applicant respectfully traverses.

The Office Action relies on the combination of Fujiwara and Halvis as applied to the rejection of claims 62 and 65. The applicant respectfully submits that this combination of references is not adequately supported by reference to specific text in the references as is discussed above with respect to claims 62 and 65.

For the reasons stated above with respect to the rejection of claims 62 and 65, and the limitations in the claims, the applicant respectfully submits that a *prima facie* case of obviousness

of claims 63-64 and 66-67 has **not** been established in the Office Action, and that claims 63-64 and 66-67 are in condition for allowance

Claim 68 was rejected under 35 USC § 103(a) as being unpatentable over Fujiwara in view of Weitzel and Hamakawa, or in the alternative, in view of Halvis.

The Office Action has not referred to specific text in Fujiwara or Halvis to support their combination as is required by *In re Lee*. For example, the Office Action states that “[t]he inventions by Fujiwara and Halvis et al can be combined as nothing else would have to be modified in the basic transistor design” and “the motivation for lowering the carbon content stems from the cost of introducing the carbon.” Office Action, page 16. There is no cited support for these statements in the prior art.

The Office Action has not referred to sufficient text in Fujiwara, Weitzel, or Hamakawa to support their combination as is required by *In re Lee*. For example, the Office Action states that “silicon carbide gates have long been applied to achieve better breakdown characteristics in field effect transistors, as witnessed by Weitzel.” Office Action, page 16. However, there is no apparent connection between the breakdown voltage and the material of the gates 18 in Weitzel as is discussed above with respect to the rejection of claims 36-39.

The applicant respectfully submits that a *prima facie* case of obviousness of claim 68 has **not** been established in the Office Action, and that claim 68 is in condition for allowance.

Claim 69 was rejected under 35 USC § 103(a) as being unpatentable over Fujiwara and Halvis, or, in the alternative, over Fujiwara, Weitzel, and Hamakawa, and further in view of Miyawaki. The applicant respectfully traverses.

The Office Action relies on the combinations of Fujiwara and Halvis and Fujiwara, Weitzel, and Hamakawa as applied to the rejection of claim 68. The applicant respectfully submits that these combinations of references are not adequately supported by reference to specific text in the references as is discussed above with respect to claim 68. The Office Action also does not refer to a showing of a suggestion to combine Miyawaki with these references as is required by *In re Lee*.

For the reasons stated above with respect to the rejection of claim 68, and the limitations in the claim, the applicant respectfully submits that a *prima facie* case of obviousness of claim 69 has **not** been established in the Office Action, and that claim 69 is in condition for allowance.

Claim 70 was rejected under 35 USC § 103(a) as being unpatentable over Fujiwara, Halvis, and Miyawaki, or, in the alternative, over Fujiwara, Weitzel, Hamakawa, and Miyawaki, and further in view of Shrivastava. The applicant respectfully traverses.

The Office Action relies on the combinations of Fujiwara and Halvis and Fujiwara, Weitzel, and Hamakawa with Miyawaki as applied to the rejection of claim 69. The applicant respectfully submits that these combinations of references are not adequately supported by reference to specific text in the references as is discussed above with respect to claim 69.

For the reasons stated above with respect to the rejection of claims 68 and 69, and the limitations in the claim, the applicant respectfully submits that a *prima facie* case of obviousness of claim 70 has **not** been established in the Office Action, and that claim 70 is in condition for allowance.

Claims 71, 80, and 83 were rejected under 35 USC § 103(a) as being unpatentable over Fujiwara in view of Weitzel and Hamakawa. The applicant respectfully traverses.

The Office Action has not referred to specific text in Fujiwara, Weitzel, or Hamakawa to support their combination as is required by *In re Lee*.

The applicant respectfully submits that a *prima facie* case of obviousness of claims 71, 80, and 83 has **not** been established in the Office Action, and that claims 71, 80, and 83 are in condition for allowance

Claims 72-73, 81-82, and 84-85 were rejected under 35 USC § 103(a) as being unpatentable over Fujiwara, Weitzel and Hamakawa, and further in view of Miyawaki. The applicant respectfully traverses.

The Office Action relies on the combinations of Fujiwara, Weitzel, and Hamakawa as applied to the rejection of claims 71, 80, and 83. The applicant respectfully submits that this

combinations of references is not adequately supported by reference to specific text in the references as is discussed above with respect to claims 71, 80, and 83. The Office Action also has not referred to specific text in Fujiwara, Weitzel, or Hamakawa to support their combination with Miyawaki as is required by *In re Lee*.

For the reasons stated above with respect to the rejection of claims 71, 80, and 83, and the limitations in the claims, the applicant respectfully submits that a *prima facie* case of obviousness of claims 72-73, 81-82, and 84-85 has **not** been established in the Office Action, and that claims 72-73, 81-82, and 84-85 are in condition for allowance.

Claims 74, 76-77, and 79 were rejected under 35 USC § 103(a) as being unpatentable over Fujiwara in view of Halvis. The applicant respectfully traverses.

The Office Action has not referred to specific text in Fujiwara or Halvis to support their combination as is required by *In re Lee*. For example, the Office Action states that “[t]he inventions by Fujiwara and Halvis et al can be combined as nothing else would have to be modified in the basic transistor design.” Office Action, page 19. There is no cited support for these statements in the prior art.

The applicant respectfully submits that a *prima facie* case of obviousness of claims 74, 76-77, and 79 has **not** been established in the Office Action, and that claims 74, 76-77, and 79 are in condition for allowance

Claims 76 and 79 were rejected under 35 USC § 103(a) as being unpatentable over Fujiwara and Halvis, and further in view of Shrivastava. The applicant respectfully traverses.

The Office Action relies on the combination of Fujiwara and Halvis as applied to the rejection of claims 74, 76-77, and 79. The applicant respectfully submits that this combination of references is not adequately supported by reference to specific text in the references as is discussed above with respect to claims 74, 76-77, and 79. The Office Action also has not referred to specific text in the references to support the combination with Shrivastava as is required by *In re Lee*.

For the reasons stated above with respect to the rejection of claims 74, 76-77, and 79, and the limitations in the claims, the applicant respectfully submits that a *prima facie* case of obviousness of claims 76 and 79 has **not** been established in the Office Action, and that claims 76 and 79 are in condition for allowance.

Claims 75 and 78 were rejected under 35 USC § 103(a) as being unpatentable over Fujiwara and Halvis, and further in view of Miyawaki.

The Office Action relies on the combination of Fujiwara and Halvis as applied to the rejection of claims 74, 76-77, and 79. The applicant respectfully submits that this combination of references is not adequately supported by reference to specific text in the references as is discussed above with respect to claims 74, 76-77, and 79. The Office Action also has not referred to specific text in the references to support the combination with Miyawaki as is required by *In re Lee*.

For the reasons stated above with respect to the rejection of claims 74, 76-77, and 79, and the limitations in the claims, the applicant respectfully submits that a *prima facie* case of obviousness of claims 75 and 78 has **not** been established in the Office Action, and that claims 75 and 78 are in condition for allowance.

Claim 98 was rejected under 35 USC § 103(a) as being unpatentable over Fujiwara, Weitzel, and Hamakawa as applied to claim 36 above, and further in view of Miyawaki.

The Office Action relies on the combination of Fujiwara, Weitzel, and Hamakawa as applied to the rejection of claim 36. The applicant respectfully submits that this combination of references is not adequately supported by reference to specific text in the references as is discussed above with respect to claim 36. The Office Action also has not referred to specific text in the references to support the combination with Miyawaki as is required by *In re Lee*.

For the reasons stated above with respect to the rejection of claim 36, and the limitations in the claim, the applicant respectfully submits that a *prima facie* case of obviousness of claim 98 has **not** been established in the Office Action, and that claim 98 is in condition for allowance.

Claim 99 was rejected under 35 USC § 103(a) as being unpatentable over Fujiwara, Weitzel, and Hamakawa, and further in view of Miyawaki and Shrivastava.

The Office Action relies on the combination of Fujiwara, Weitzel, and Hamakawa as applied to the rejection of claim 37. The applicant respectfully submits that this combination of references is not adequately supported by reference to specific text in the references as is discussed above with respect to claim 37. The Office Action also has not referred to specific text in the references to support the combination with Miyawaki and Shrivastava as is required by *In re Lee*.

For the reasons stated above with respect to the rejection of claim 37, and the limitations in the claim, the applicant respectfully submits that a *prima facie* case of obviousness of claim 99 has **not** been established in the Office Action, and that claim 99 is in condition for allowance.

Claim 100 was rejected under 35 USC § 103(a) as being unpatentable over Fujiwara, Weitzel, and Hamakawa, and further in view of Miyawaki and Shrivastava.

The Office Action relies on the combination of Fujiwara, Weitzel, and Hamakawa as applied to the rejection of claim 40. The applicant respectfully submits that this combination of references is not adequately supported by reference to specific text in the references as is discussed above with respect to claim 40. The Office Action also has not referred to specific text in the references to support the combination with Miyawaki and Shrivastava as is required by *In re Lee*.

For the reasons stated above with respect to the rejection of claim 40, and the limitations in the claim, the applicant respectfully submits that a *prima facie* case of obviousness of claim 100 has **not** been established in the Office Action, and that claim 100 is in condition for allowance.